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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,425	07/03/2001	Satoshi Niyama	206228US0PCT	6245

22850 7590 07/03/2003

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
SADULA, JENNIFER R	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/807,425	Applicant(s) NIYAMA ET AL
	Examiner Jennifer R. Sadula	Art Unit 1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10* .
4) ☒ Interview Summary (PTO-413) Paper No(s). *11* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

The following Office Action is a complete response to the amendment and arguments filed 10 June 2003. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claims 17-23 are objected to because of the following informalities: these claims depend from cancelled claims 1-16. These claims have not been acted upon in accordance with the Applicants request (see the interview summary of 25 June 2003 attached herewith). Appropriate correction is required.

Claim Objections

Claim 31 is objected to because of the following informalities: Applicants have made the argument telephonically and in the declaration of record that the invention differs from the previously cited prior art in that the uncured curable compound is non-liquid crystalline. Claim 31 depends from claim 24 which states that the uncured curable compound contain Z is a "bivalent mesogen structure".

The term "mesogenic" or "mesogen" as is used herein designates compounds containing one or more rigid rodlike structural units which have been found to favor the formation of liquid crystalline phases in the case of low molar mass substances. Thus the mesogen or mesogenic moiety is further defined by R. A. Weiss (ed.) and C. K. Ober (ed.) in Liquid-Crystalline

Polymers, ACS Symposium Series 435 (1989) on pages 1-2: "The rigid unit responsible for the liquid crystalline behavior is referred to as the mesogen."

Applicants are hereby informed that claim 31 is interpreted as containing an additional component which is non-liquid crystalline, but that the materials still maintain curable liquid crystals as claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24-27, 32-33, 35 and 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota et al., U.S. Patent No. 6,128,056, in view of Tamura et al., U.S. Patent No 6,576,303 ("Tamura").

Kubota teaches a liquid crystal display element in which the polymer liquid crystal composite layer contains polymeric dispersed liquid crystals (PDLC) or polymeric network liquid crystals (PNLC). The methods for making such a composite layer are found throughout the specification (i.e. 13:1-31) wherein a polymeric precursor is polymerized via radiation after phase separation and while droplets of liquid crystal are dispersed throughout the precursor.

Kubota teaches that the invention provides a liquid crystal display element comprising a first substrate, a second substrate and the polymer composite layer disposed there between (15:16-31). Kubota further teaches the methods for making a thin film transistor (TFT) for use

with the PDLC and PNLC's (20:48-21:53). Various kinds lf liquid crystals that exhibit a LC state at around room temperature may be adopted as the liquid crystalline materials. Furthermore, no particular limitation is made to the polymer compound as long as it has light permeability and enables the liquid crystals to be held in the polymer resin matrix after the polymer liquid crystal composite is formed. PNM 201, available from Dainippon Ink and Chemicals Inc. was utilized as the PDLC polymer. This material satisfies the limitations of applicants' generic formula 1.

With regard to claim 32 it is inherent to the teaching of a PDLC or PNLC, such as those of Kubota, to have one component be twice the molecular weight of the other as a liquid crystal and a polymer material will satisfy such a requirement. Furthermore with regard to claim 33 the liquid crystal being dispersed within a curable compound such that the material is later cured would satisfy the requirement that the curable compound be mesogen and non-mesogen in nature. However, Kubota is silent to the specific liquid crystals utilized.

Tamura teaches liquid crystalline compounds exhibiting negative anisotropic behavior wherein the composition scan be used as ones for guest-host systems by adding a dychroic dye or as NCAP which is prepared by the microencapsulation of a nematic liquid crystal or as a polymer dispersed liquid crystal (PDLC) represented by a polymer network liquid crystal (40:42-53). The materials of Tamura require no chiral additive and may further include an alignment or orienting film or mechanism depending upon their usage (such as for a TN display).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the device and composite layer of Kubota with the liquid crystals of Tamura as Kubota teaches the liquid crystals to be any type and may be used in combinations of two or

more (such as nematic, cholesteric and smectic) and Tamura teaches liquid crystals falling into these preferred categories for use in a PDLC composite materials and device.

Claims 24-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota et al., U.S. Patent No. 6,128,056, in view of Tamura et al., U.S. Patent No 6,576,303 ("Tamura") and further in view of Hikmet et al., U.S. Patent No. 6,171,518 ("Hikmet II").

Kubota teaches the PDLC and PNLC components and device substantially as claimed, as detailed above. Kubota further teaches no particular limitation to the polymer compound as long as it has light permeability and enables the liquid crystals to be held in the polymer resin matrix after the polymer liquid crystal composite is formed.

Tamura teaches liquid crystalline compounds exhibiting negative anisotropic behavior wherein the composition scan be used as ones for guest-host systems by adding a dychroic dye or as NCAP which is prepared by the microencapsulation of a nematic liquid crystal or as a polymer dispersed liquid crystal (PDLC) represented by a polymer network liquid crystal (40:42-53). The materials of Tamura require no chiral additive and may further include an alignment or orienting film or mechanism depending upon their usage (such as for a TN display).

Hikmet II teaches a method of preparing a cross-linked macroscopically oriented LC polymer network which comprises the steps of orienting and polymerizing a LC composition (abstract). Suitable examples of LC monomers satisfy the formula $Y\text{-}X^1\text{-}L^1\text{-}M\text{-}L^2\text{-}X^2\text{-}Y$ wherein Y can be an assortment of polymerizable groups including acrylates (thereby making the resultant compound a diacrylate if warranted); the X's are spacer units which may be interrupted by one or more oxygen units; the L linking groups may be meth- or oxygen groups and the

mesogen may be, among other selections,. M^1-M^2 wherein the M's may represent 1,4-phenylene groupings (3:48-4:21). These polymers are light permeable and capable of holding a liquid crystal in a polymer resin matrix.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the PDLC or PNLC of Kubota with the liquid crystals of Tamura further comprising the polymer materials of Hikmet II as Kubota does not specify the polymers other than to say that they are light permeable and capable of holding the liquid crystals in the polymer resin matrix.

Claims 24-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota et al., U.S. Patent No. 6,128,056, in view of Kobayashi et al., U.S. Patent No. 5,686,017 ("Kobayashi").

Kubota teaches the PDLC and PNLC components and device substantially as claimed, as detailed above. Kubota further teaches no particular limitation to the polymer compound as long as it has light permeability and enables the liquid crystals to be held in the polymer resin matrix after the polymer liquid crystal composite is formed.

Kobayashi teaches PDLC display elements utilizing liquid crystals as shown in column 6 and polymer precursors as shown in column 7. The polymer precursors taught fall within the range of the Applicant's limitations of the polymer precursor. The particular polymeric material may, but do not require, the use of a chiral component (abstract). The device may be produced as a reverse PDLC medium (9:1-43). The alignment treatment employed is a polyimide alignment film and subjected to rubbing, however other forms of alignment may also be used

(14:57-65). Additionally, the liquid crystals used may have a negative dielectric anisotropy (12:28-31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the device and composite layer of Kubota with the liquid crystals and polymers of Kobayashi as Kubota teaches the liquid crystals to be any type and may be used in combinations of two or more (such as nematic, cholesteric and smectic) and Kobayashi teaches liquid crystals falling into these preferred categories for use in a PDLC composite materials and device with the polymers as specified.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is 703.305.4835. The examiner can normally be reached on Monday through Friday, 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 703.308.2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

JRS
June 26, 2003

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700